AAC Journals.ASM.org

Identifying Patients Harboring Extended-Spectrum-β-Lactamase-Producing *Enterobacteriaceae* on Hospital Admission Is Not That Simple

We read with interest the paper by Mario Tumbarello et al. (3), and we agree with the authors that identification of the patients at high risk of infection with extended-spectrum-β-lactamase (ESBL)-producing *Enterobacteriaceae* (ESBL-E) is a key issue. Their identification of patients at high risk of infection in the hospital has major effects upon infection control policies and upon empirical antimicrobial therapy. These authors developed a tool for identifying patients harboring ESBL-E on hospital admission, using a score based on 6 easy-to-define weighed variables (see Table 1, footnote *a*). In their hands, the performances of the test (Table 1) were very good and allow them to propose (i) infection control measures targeted to patients with a score ≥ 6 and (ii) the use of carbapenems for patients with a score ≥ 3 with severe infections or already severely ill.

We have used this scoring method to identify patients carrying ESBL-producing *Escherichia coli* (ESBL-Ec) in our French university hospital, where this species represents approximately 75% of the total ESBL-E (unpublished data). We scored 87 patients hospitalized between March and December 2009: 29 cases (patients infected with an ESBL-Ec within 48 h of admission) and 58 controls (patients not infected with ESBL-Ec in the same time period). Since in-hospital ESBL-Ec cross-transmission is uncommon in our hospital (D. Hocquet, P. Cholley, M. Sauget, S. Pujol, M. Thouverez, D. Talon, and X. Bertrand, submitted for publication), we extended the analysis to 67 cases (patients infected with an ESBL-Ec during their hospital stay) and 134 controls. The cases and controls (2 per case) were matched by hospital ward and month of admission. Statistical analyses were performed using the Intercooled Stata 10 (Stata Corp., College Station, TX).

In Table 1, we detail the performance of this scoring method applied to our two series. In our hands, the scoring method did not accurately discriminate patients at risk of ESBL-Ec infections, whatever the date of infection.

We hypothesized that the major discrepancy between the two series could be explained by the mix of cases displayed by the patients or by the difference in ESBL-E epidemiology (2). In contrast with Tumbarello and colleagues who also included patients infected with ESBL-producing *Klebsiella* and *Proteus* in their series, we scored patients only infected with ESBL-Ec. However, *E. coli* represented the vast majority (87.2%) of the bacteria in their validation set. Our hospital and the three Italian hospitals were quite similar (full-service teaching hospitals with similar numbers of beds and yearly admissions). European Antimicrobial Resistance Surveillance System (EARSS) data in 2009 reported a higher proportion of ESBL-Ec among *E. coli* bacteria in Italian hospitals (17%) than in French hospitals (7%). However, the same database showed a similar increasing trend in the two countries (http://www.ecdc.europa.eu).

The identification of ESBL-E carriers upon admission to a hospital is crucial to treat patients with antibiotic therapy that is effective against severe ESBL-E infections (i.e., based on carbapenems). However, carbapenems must be used prudently, since their use leads to the rapid emergence of resistance (1). The authors discussed the generalization of their tool to a broad range of facilities. Although their scoring system is undoubtedly useful to identify the ESBL-E carriers in their hospital, we show here that it has to be validated locally before its use.

TABLE 1 Comparison of the performance of the scoring method of Tumbarello et al. on three different sets of patients[a]

Category and parameter	Value for parameter		
		This study (cases infected with an ESBL-Ec)	
	Tumbarello et al. validation set	<48 h after admission	During their hospital stay
No. of cases	102	29	67
No. of controls	408	58	134
Case mean score	7.69	4.48	5.47
Control mean score	1.68	3.76	4.11
Score ≥ 3			
Sensitivity (%)	93	72	78
Specificity (%)	74	34	34
No. of false-negative results	7	8	15
No. of false-positive results	108	38	89
Rate of accuracy (%)	77	47	49
Score ≥ 6			
Sensitivity (%)	73	34	46
Specificity (%)	95	81	75
No. of false-negative results	28	19	36
No. of false-positive results	20	11	34
Rate of accuracy (%)	91	66	65
ROC area (95% CI)[b]	0.92 (0.89–0.95)	0.57 (0.43–0.70)	0.62 (0.54–0.68)

[a] The predictive scoring system defined by Tumbarello et al. (3) is based on 6 easy-to-define weighed variables: recent (≤12 months before admission) hospitalization (3 points), transfer from another health care facility (3 points), Charlson comorbidity score ≥ 4 (2 points), recent (≤3 months before admission) β-lactam and/or fluoroquinolone treatment (2 points), recent urinary catheterization (2 points), and age ≥ 70 years (2 points).

[b] ROC, receiver operating characteristic; 95% CI, 95% confidence interval.

REFERENCES

1. **Nordmann P, Naas T, Poirel L.** 2011. Global spread of carbapenemase-producing *Enterobacteriaceae.* Emerg. Infect. Dis. **17**:1791–1798.
2. **Pitout JD.** 2010. Infections with extended-spectrum β-lactamase-

Address correspondence to Didier Hocquet, dhocquet@chu-besancon.fr.

For the author reply, see doi:10.1128/AAC.06419-11.

doi:10.1128/AAC.06376-11

producing *Enterobacteriaceae*: changing epidemiology and drug treatment choices. Drugs **70**:313–333.
3. **Tumbarello M, et al.** 2011. Identifying patients harboring extended-spectrum-β-lactamase-producing *Enterobacteriaceae* on hospital admission: derivation and validation of a scoring system. Antimicrob. Agents Chemother. **55**:3485–3490.

Céline Slekovec
Xavier Bertrand
Service d'Hygiène Hospitalière
Centre Hospitalier Régional Universitaire de Besançon
UMR6249
Université de Franche-Comté
Besançon, France

Joël Leroy
Service des Maladies Infectieuses et Tropicales
Centre Hospitalier Régional Universitaire de Besançon
Besançon, France

Jean-Pierre Faller
Service des Maladies Infectieuses et Réanimation
Centre Hospitalier de Belfort-Montbéliard
Belfort, France

Daniel Talon
Didier Hocquet
Service d'Hygiène Hospitalière
Centre Hospitalier Régional Universitaire de Besançon
UMR6249
Université de Franche-Comté
Besançon, France